

IN THE CLAIMS:

Kindly amend claim 12 as shown in the following listing of claims, which replaces all previous versions and listings of claims.

1. (previously presented) An information recording medium comprising: a read-out track having a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, the servo bits having a first groove that is deep in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium, and a second groove that is deep in a direction opposite to the first groove and having a depth gradually increasing along the read-out track.


2. (previously presented) An information recording medium as claimed in claim 1; wherein the first groove and the second groove are triangular in section taken in the direction perpendicular to the length of the read-out track.

3. (previously presented) An information recording medium as claimed in claim 1; wherein the first groove and the second groove have a stepped cross-section taken in the direction perpendicular to the length of the read-out track.

4. (previously presented) An information recording medium comprising: a read-out track having a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, the servo bits having a first groove extending in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium, and a second groove extending in a direction opposite to the first groove.

5. (previously presented) An information recording medium comprising: a read-out track having a center axis and containing a unit of information to be reproduced by a reproducing probe having a microscopic aperture, the unit of information being comprised of a groove having a depth which increases constantly or gradually in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium for detecting a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe.

6. (previously presented) An information recording medium comprising: a read-out track having a center axis and a groove containing a unit of information to be reproduced by a reproducing probe having a microscopic aperture, the groove being saw tooth-shaped in a section taken in a direction



perpendicular to a read-out direction, the unit of information being formed along a slant surface of the saw tooth-shaped groove which is configured to allow detection of a deviation of the microscopic aperture of the reproducing probe from the center axis of the read-out track during reproduction of the unit of information by the reproducing probe.

7. (previously presented) An information reproducing apparatus comprising:

an information recording medium having on a read-out track a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, the servo bits being arranged with a constant deviation alternately left and right with respect to a center axis of the read-out track;

a reproducing probe for reading the read-out track, the reproducing probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out track so that the near-field light is scattered by the servo bits formed in the servo pattern region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the servo data and for outputting a detection signal;

comparison operating means for comparing a detection signal outputted from the photo-detecting means with a synchronization signal determined in accordance with an interval of the servo bits and for generating and outputting a differential signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with a differential signal outputted by the comparison operating means.

8. (previously presented) An information reproducing apparatus comprising:

an information recording medium having on a read-out track a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, the servo bits having a first groove that is deep in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium, and a second groove that is deep in a direction opposite to the first groove and having a depth gradually increasing along the read-out track;

a reproducing probe for reading the read-out track, the reproducing probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out

track so that the near-field light is scattered by the servo bits formed in the servo region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the servo data and for outputting a detection signal;

comparison operating means for comparing a detection signal outputted from the photo-detecting means with a synchronization signal determined in accordance with an interval of the servo bits and for generating and outputting a differential signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with a differential signal outputted by the comparison operating means.

9. (previously presented) An information reproducing apparatus comprising:

an information recording medium having on a read-out track a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, the servo bits having a first groove extending in a direction perpendicular to both a length of the read-out track and a depth of the information recording medium, and a second groove extending in a direction opposite to the first groove;

a reproducing probe for reading the read-out track, the reproducing probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out track so that the near-field light is scattered by the servo bits formed in the servo region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the servo data and for outputting a detection signal;

comparison operating means for comparing a detection signal outputted from the photo-detecting means with a synchronization signal determined in accordance with an interval of the servo bits and for generating and outputting a differential signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with a differential signal outputted by the comparison operating means.

10. (previously presented) An information reproducing apparatus comprising:

an information recording medium containing a unit of information comprised of a groove having a depth which increases constantly or gradually in a direction perpendicular

to both a length of the read-out track and a depth of the information recording medium;

a reproducing probe for reading the read-out track, the reproducing probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out track so that the near-field light is scattered by the servo bits formed in the servo region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the servo data and for outputting a detection signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with an intensity of the detection signal outputted by the photo-detecting means.

11. (previously presented) An information reproducing apparatus comprising:

an information recording medium having a groove containing a unit of information, the groove being saw tooth-shaped in a section taken in a direction perpendicular to a read-out direction, the unit of information being formed along a slant surface of the saw tooth-shaped groove;

a reproducing probe for reading the read-out track, the reproducing probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out track so that the near-field light is scattered by the servo bits formed in the servo region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the servo data and for outputting a detection signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with an intensity of the detection signal outputted by the photo-detecting means.

12. (currently amended) An information reproducing apparatus comprising:

an information recording medium having a read-out track containing information;

a reproducing probe for reading the read-out track of the information recording medium, the reproducing probe having a microscopic ~~apertures~~ aperture for producing near-field light and for directing the near-field light toward the read-out track during reading of the read-out track so that the near-field light is scattered by the information contained in the read-out track, the microscopic ~~apertures~~

~~extending at an interval~~ aperture having a width in a direction of the read-out track that gradually increases in a direction perpendicular to both a the direction of the read-out track and a direction of a depth of the information recording medium;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light by the information contained in the read-out track and for outputting a detection signal; and

reproducing-probe-position control means for controlling a position of the reproducing probe in accordance with an intensity of the detection signal outputted by the photo-detecting means.

13. (previously presented) An information recording medium comprising: a read-out track having a data region forming data bits for reproduced data and a servo pattern region forming servo bits for tracking control, two of the servo bits being asymmetric in section about a direction of the read-out track and symmetric in section about a center axis of the read-out track.

14. (previously presented) An information recording medium comprising: a read-out track having a center axis and units of information to be recorded/reproduced by a probe, the units of information being comprised of grooves disposed

asymmetric about the center axis of the read-out track, each of the grooves having a slant surface configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe.

15. (previously presented) An information recording medium comprising: a read-out track having a center axis, a slant surface, and a unit of information formed along the slant surface, the read-out track being asymmetric about an axis extending in a direction generally perpendicular to a scanning direction of a probe for recording/reproducing the unit information of the read-out track, and the slant surface being configured to allow detection of a deviation of the probe from the center axis of the read-out track during recordal/reproduction of the unit of information by the probe.

16. (previously presented) An information recording/reproducing apparatus comprising:

an information recording medium according to claim 13;

a probe for recording/reproducing the data and servo bits in the data and servo pattern regions of the read-out track of the information recording medium, the probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out

track so that the near-field light is scattered by the servo bits formed in the servo region of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light and for outputting a detection signal; and

probe-position control means for controlling a position of the probe in accordance with an intensity of the detection signal or a differential signal between the detection signal and a reference signal.

17. (previously presented) An information recording/reproducing apparatus comprising:

an information recording medium comprised of a read-out track having a unit of information to be recorded/reproduced by a probe, the unit of information being asymmetric about a direction of the read-out track;

a probe for recording/reproducing the unit of information of the read-out track of the information recording medium, the probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track so that the near-field light is scattered by the unit of information of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of

the near-field light and for outputting a detection signal;
and

probe-position control means for controlling a position of the probe in accordance with an intensity of the detection signal or a differential signal between the detection signal and a reference signal.

18. (previously presented) An information recording/reproducing apparatus comprising:

an information recording medium comprised of a read-out track having a slant surface and a unit of information formed along the slant surface, the read-out track being asymmetric about an axis extending in a direction generally perpendicular to a scanning direction of a probe for recording/reproducing the unit information of the read-out track;

a probe for recording/reproducing the unit of information of the read-out track of the information recording medium, the probe having a microscopic aperture for producing near-field light and for directing the near-field light toward the read-out track so that the near-field light is scattered by the unit of information of the read-out track;

photo-detecting means for detecting reflection scattering light generated as a result of the scattering of the near-field light and for outputting a detection signal;
and

probe-position control means for controlling a position of the probe in accordance with an intensity of the detection signal or a differential signal between the detection signal and a reference signal.

19. (previously presented) An information recording medium comprising: a read-out track having a servo pattern region; and a plurality of servo bits formed in the servo pattern region for tracking control, the servo bits having first grooves extending deep in a direction perpendicular to both a depth of the information recording medium and a length of the read-out track, and second grooves extending deep in a direction opposite to the first grooves and alternating with the first grooves.

20. (previously presented) An information recording medium according to claim 19; wherein each of the first grooves has a depth which gradually increases along the read-out track.